

What is Claimed is:

1. A computer controlled automatic soldering machine comprising:

5 a heater to provide heat to a quantity of solder wire and to parts in a soldering position for soldering; and

means to move said heater and solder wire into the soldering position, wherein controls and mechanisms for a complete cycle sequence are not manually adjustable by a machine operator or by a production setup person.

10 2. Apparatus according to claim 1, wherein mechanisms for moving the heater and solder wire are actuated by cams.

15 3. Apparatus according to claim 2, further comprising: various adjustments which may be controlled by a machine operator, a production setup person, or a computer.

20 4. Apparatus according to claim 3, wherein said means to move said heater into the soldering position includes a pivot mounted frame for supporting a heater assembly.

5. An apparatus for soldering comprising:

a solder wire feeder having a rigid guide rail with an axial groove for nesting and guiding solder wire, and

25 an oscillating bar positioned over the rail which supports a sharp point for engaging the solder wire as required for a forward feed motion.

30 6. Apparatus according to claim 5, wherein the rigid guide rail has a front end positioned within about 16 diameters of a solder wire diameter

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from a solder tip, and wherein the front end of the guide rail contains a
biasing device which holds the solder wire within the groove.

5 7. An oil pouch for applying a coat of oil on solder wire and the
like, the oil pouch comprising:

an oil filled, open pore sponge elastomer contained within a sealed
plastic bag, wherein the pouch is used on an in-line soldering system and is by
pierced through for allowing soldering wire to pass through the bag and
sponge.

10 8. A soldering machine comprising:
a heated metal tip; and
means to periodically position the tip for a soldering operation,
wherein the metal tip can be periodically heated to various temperatures at a
15 rate of 0.75 seconds or less, within a range of about 500°F to 700°F, and can be
cooled to various temperatures at a rate of about 1.5 seconds or less within a
range of about 700°F to 500°F.

20 9. Apparatus according to claim 8, wherein a means to heat the
metal tip is an electrical current of at least about 300 amperes.

10. Apparatus according to claim 9, wherein the electrical current is
alternating at a frequency between about 10 and 100 Hertz.

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11. Apparatus according to claim 10, wherein a short pulse of the
electrical current is applied to the tip simultaneously with removal of the tip
away from a soldered part or parts.

30 12. Apparatus according to claim 8, wherein the metal tip
comprises:

one or more wire entrance holes capable of receiving a portion of solder wire that is about 0.125 inches in diameter or less; and

one or more intersecting holes to allow exit of molten solder onto a part or parts to be soldered, wherein the one or more wire entrance holes has a properly designed shape, dimension, material, temperature, a controlled solder wire feed rate, and force to prevent molten solder and/or flux from ejecting out of the one or more wire entrance holes.

13. Apparatus according to claim 12, wherein a means to heat the metal tip is an electrical current of at least about 300 amperes, and is alternating at a frequency between about 10 and 100 Hertz.

14. An apparatus for soldering comprising:

a heated solder tip; and

a solder wire feeder wherein said solder tip is at a relatively constant temperature and has one or more holes to receive a portion of solder wire that is about 0.125 inches in diameter or less, and has one or more intersecting holes to allow exit of molten solder onto a part to be soldered, and wherein the one or more holes are of a properly designed shape, dimension, material, temperature, a controlled solder wire feed rate, and force to prevent molten solder and/or flux from ejecting out of an entrance of the one or more holes.

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